

## HISTORY OF WIND SHEAR TURBULENCE MODELS

Lou Cusimano  
Office of Flight Operations  
Federal Aviation Administration

INTRODUCTION

The Office of Flight Operations, Flight Technical Programs Division, at the Federal Aviation Administration (FAA) Headquarters in Washington, DC, interfaces with industry, R&D communities and air carriers during the introduction of new types of equipment into operational services. This is a brief highlight of the need which FAA operations sees for new wind shear and turbulence data sets from the viewpoint of equipment certification and simulation.

Last November our office published Advisory Circular 120-41 (ref. 1) "Criteria for Operational Approval of Airborne Wind Shear Alerting and Flight Guidance Systems." In general, it lays out a method for air carriers to receive operational approval to use airborne wind shear devices in revenue services. Part of that methodology requires the use of some type of simulation of wind shear for the purpose of evaluating the effectiveness of a system.

In that document, we did not define any particular wind models for an applicant air carrier to use. Instead, we included the SRI data sets as an example of wind shear model simulation format as well as a challenge to the individual applicant to develop a model which would be effective for his particular situation. We also made a promise in that advisory circular to continue working toward the development of more specific wind shear models, and publish the same as soon as they were available.

Ultimately, we would like to provide a sample of acceptable wind shear models for the various aircraft performance characteristics commonly used in air carrier operations today; and, in that way, unburden the applicant to a certain extent in the approval process. After all, we are trying to encourage the use of these systems, not discourage their use.

In addition to airborne wind shear devices, we also work very closely with FAA's Directorate Certification Regions in the approval of other types of equipment requiring realistic turbulence and wind shear simulation models. An example of this is autoland systems, which are used in Category III operations and head-up displays, and also for low-visibility approaches. Of course, there are advisory circulars available which deal with those types of approvals; and, for real need for a continuing effort in developing realistic models which can be utilized for these efforts. Also, more research into the characterization of turbulence is needed, particularly very close to the ground, where it most effects the outcome of an approach.

Training aircrews to deal with wind shear, if they inadvertently find themselves in it, is very important to the air carrier operations staff. Of course, that training can best be carried out with realistic simulation models. It is my belief that NASA, NCAR, NOAA, and many of the other organizations have tremendous capability and a challenge from industry to move ahead in the development of these new models.

#### REFERENCE

1. Criteria for Operational Approval of Airborne Wind Shear Alerting and Flight Guidance Systems. Advisory Circular 120-41, Federal Aviation Administration, Nov. 1983.